

Anal Intercourse Among Young Heterosexuals in Three Sexually Transmitted Disease Clinics in the United States

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Objective: To examine factors associated with heterosexual anal intercourse (AI).

Methods: Between 2001 and 2004, 1084 heterosexual adults aged 18 to 26 attending public sexually transmitted disease clinics in Seattle, New Orleans, and St Louis were interviewed using computer-assisted self interview and tested for STIs; *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Mycoplasma genitalium*, *Trichomonas vaginalis*, and genital herpes (HSV-2). Characteristics associated with AI were identified using logistic regression.

Results: Overall 400 (37%) reported ever having had AI, 266 (28.9%) reported AI with at least 1 of their last 3 partners, and 19% reported AI with their last partner. Fewer women than men reported condom use at last AI (26% vs. 45%, $P < 0.001$). Ever having AI was associated with sex on the same day as meeting a partner [AOR 3.9 (95% CI, 2.46–6.21)], receiving money for sex [AOR 2.8 (1.40–5.45)], and >3 lifetime sex partners [AOR 2.8 (1.56–5.07)] among women, and sex on the same day as meeting a partner [AOR 2.0 (1.33–3.06)] among men. AI with the last partner was associated with sex toy use [AOR 5.6 (2.63–12.0)] and having concurrent partners [AOR 2.2 (1.21–4.11)] among men, and with sex within a week of meeting [AOR 2.4 (1.28–4.37)], believing the partner was concurrent (AOR 1.9 [1.12–3.22]), and sex toy use [AOR 5.7 (2.31–14.0)] among women. Prevalent vaginal and urethral sexually transmitted infections were not associated with AI.

Conclusions: Many young heterosexuals attending sexually transmitted disease clinics reported AI, which was associated with other sexual risk behaviors, suggesting a confluence of risks for HIV infection.

Men who have sex with men represent a minority of the US male population (estimated at 2.3%¹–13%²) and most (95%) report having engaged in anal intercourse (AI). Less is known about this practice among heterosexuals,³ although

prevalence estimates range between 10% and 35% for heterosexual women in the United States and UK^{1,2,4,5} and as high as 40% of US men report AI with a women partner.¹ In absolute numbers, 7 times more US heterosexual women than homosexual men engage in AI.³ In heterosexual samples, reported AI ranged from 23% of “nonvirgin” university students⁶ to 32% of sexually active women at high risk of HIV in the previous 6 months⁷ and is relatively frequent with 7% of sexually active respondents reporting AI at least once a month during the previous year in a household survey.⁸

Heterosexual AI has been associated with increased HIV transmission within serodiscordant couples in the United States and Brazil⁹ and with prevalent HIV infection among men and women attending sexually transmitted disease (STD) clinics in India.¹⁰ This increased risk is likely due to greater efficiency of transmission and low frequency of condom use during AI. The estimated unadjusted probability of transmitting HIV is 0.08 per contact for receptive AI,¹¹ as compared with 0.001 per coital act for vaginal intercourse.¹² Associations between AI and sexually transmitted infections (STIs)⁹ other than HIV are less consistent. AI has been associated with gonorrhea in the general population but not in STD clinic patients.¹³ Among women, AI has been significantly associated with abnormal anal cytology,^{14,15} yet little data exist on rectal carriage of other STI pathogens, largely because women’s ano-rectal sites are rarely tested.

There are few data on factors that may influence the practice of AI among heterosexuals¹⁶ or whether AI places them at higher risk for STIs. Such data could help guide interventions to reduce heterosexual HIV transmission via AI, and perhaps clarify whether rectal microbicides for STI prevention among heterosexuals are needed. Therefore, we assessed individual and partnership characteristics associated with AI among young heterosexual individuals attending 3 geographically distinct US STD clinics.

METHODS

Study Population

Between November 2001 and May 2004, 1220 adults ages 18 to 26 recruited from waiting rooms in public STD clinics in Seattle, WA, ($n = 605$), New Orleans, LA ($n = 367$), and St Louis, MO ($n = 248$) were interviewed and tested for STIs in the young adults, partnerships, and STD study. Eligibility criteria included presenting with a “new problem” consisting of symptoms of STI, or sexual contact with someone with STI. IRBs at the University of Washington, WA University at St. Louis, and Louisiana State University approved all study procedures, and approval for data analysis was received from the University of California, Los Angeles IRB.

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Supported by the UW STD CRC (NIH/NIAID AI31448).

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Received for publication June 13, 2008, and accepted October 3, 2008. DOI: 10.1097/OLQ.0b013e3181901ccf

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Survey Instrument

All study subjects participated in a combination of interviewer- and computer-assisted self interviews lasting approximately 1 hour, which included questions from Wave III of the National Longitudinal Study of Adolescent Health (Add Health)¹⁷ as well as more detailed sexual behavior questions. The computer-assisted self interview posed questions about the participant's 3 most recent romantic and sexual relationships, characteristics of these, sexual experiences, history of and exposure to STI, involvement with the criminal justice system, and substance use. All participants also underwent routine clinical examination with STI screening. Analyses focus on ever having practiced AI and AI with each of the past 3 partners. Because few participants provided complete information on more than 1 partner, our detailed analyses focused on AI reported with the most recent partnership.

Clinical and Laboratory Methods

Clinicians posed questions on sexual history and symptoms, and performed an external genital (men and women) and speculum (women) exam. Men provided a urine specimen and/or urethral swab, while women provided a urine specimen and/or cervical swab, and a self-obtained vaginal swab for STI testing. *Mycoplasma genitalium* was detected by PCR and transcription mediated assay, and *Chlamydia trachomatis* and *Neisseria gonorrhoeae* were detected using culture or nucleic acid amplification tests, as previously described.^{18–20} Suspected genital herpes (HSV-2) infection was confirmed by viral culture and *Trichomonas vaginalis* was diagnosed by wet-mount microscopy. "Any STI" was defined as a positive test for any of these pathogens.

Statistical Methods

In univariate analyses, categorical variables were assessed using Fisher Exact or Pearson chi squared test, whereas continuous variables were assessed using the Wilcoxon rank sum test. Multivariate logistic regression was used to identify factors independently associated with the practice of AI, defined in 1 model as ever having engaged in the practice and in another as having practiced AI with the most recent sex partner. Variables that were associated with STI or AI at $P \leq 0.05$ in univariate analyses were selected for testing in multivariate models and retained if $P \leq 0.05$. All univariate and multivariate analyses were stratified by city using the svy function in Stata version 8.0 (StataCorp, College Station, TX), and separate models were developed for men and women.

RESULTS

Demographic, Sexual Behavior, and Partnership Characteristics

Of the 1220 young adults enrolled, we analyzed data from 1084 individuals who reported no same-sex partners among their last 3 partners, excluding 136 who reported a same sex partner. Among these 1084 heterosexuals, 31.5% were from the New Orleans clinic, 21.3% from the St. Louis clinic, and 47.2% from the Seattle clinic. Most were men (57.7%), 25.7% were nonhispanic white, 62.4% nonhispanic black, 6.2% Hispanic, and 5.8% other. The overall median lifetime number of partners was 9, men reported more partners than women (10 vs. 7, $P = 0.13$). Similarly, the median number of partners during the past year was higher for men than for women (3 vs. 2, $P < 0.01$). Participants reported a median of 4 sex acts during the past month. At least 1 STI ("Any STI") was detected in 342/1084 (32%) persons.

Of the 920 participants who provided detailed information on their most recent partner, 201 (22%) reported an age difference of 5 years or more; more common among women (33.6%) than men (12.4%), ($P < 0.001$). Fifty-one percent reported a current partner and among these, an exclusive partner was reported by 271 (57.8%), 91 (19.4%) reported a non-exclusive dating relationship, 48 (10.2%) characterized the partnership as dating infrequently, and 59 (12.6%) said the relationship was only for sex. Among women, 59% reported initiating sex equally, 12% said she initiated sex more; and 29% said the male partner initiated sex. A similar proportion of men (57%) reported initiating sex equally; 31% said that he initiated sex; and 12% said their women partner initiated sex. Overall, 123/587 (21.0%) reported having experienced physical abuse from their most recent partner (i.e., said 'yes' to the question "your partner slapped, hit, or kicked you,") and 70/587 (11.9%) reported being forced to have sex (i.e., said 'yes' to the question "your partner insisted on or made you have sex when you didn't want to.") More men reported physical abuse (27.3%, 81/297) than women (14.5%, 42/248, $P < 0.001$). Similar percent of men and women reported being forced to have sex (13.1% vs. 10.7%, respectively). Physical abuse and forced sex in the last partnership were significantly associated with reported AI with last partner in men but not women.

Prevalence of AI

Overall 400 (37%) reported ever practicing AI; this was significantly different by gender and STD clinic (Fig. 1) although not for men across different clinics (Table 1). Of those who reported AI, 36% ($n = 144$) reported condom use during last AI, but this was reported by fewer women (26%) than men (45%) ($P < 0.001$). AI with at least one of the last 3 partners was reported by 266 (28.9%); AI with the last partner was reported by 15.7% of men and 22.6% of women ($P = 0.008$). Overall, the proportion ever engaging in AI increased steadily with age, going from 23% among 18 year old to 46% of 25 year old ($P_{\text{trend}} < 0.001$).

Factors Associated With Ever Practicing AI

In univariate analyses, fewer who reported AI reported condom use at last vaginal sex than those who did not practice AI (45.4% vs. 51.9%, $P = 0.07$). Having more lifetime partners, sex the same day as meeting a partner, and ever exchanging sex for money was significantly more common among those who had ever practiced AI (Table 1). In separate unad-

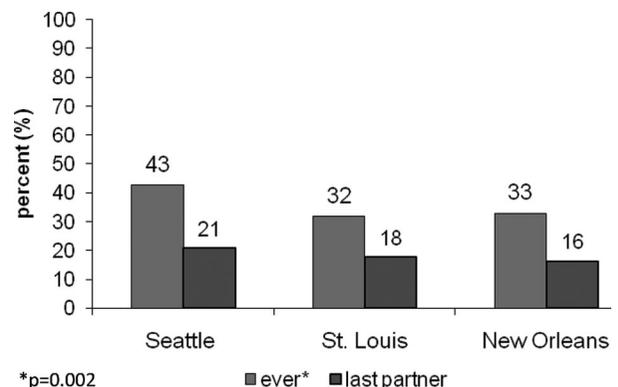


Figure 1. Percent reporting anal sex intercourse ever and with last partner, by city.

TABLE 1. Characteristics and Behaviors Among Young Adults Reporting AI

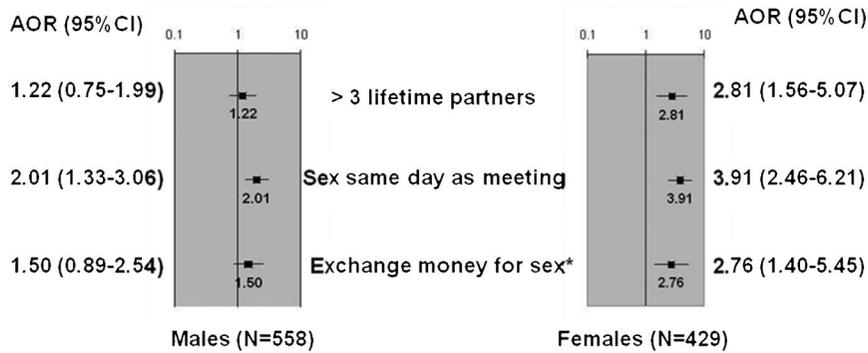
	AI Ever		AI With Last Partner	
	Yes No. (%)	No No. (%)	Yes No. (%)	No No. (%)
Males	N = 212	N = 406	N = 80	N = 429
Age (yr)*	22 [18–26] [†]	21 [18–26] [†]	21 [18–25]	21 [18–26]
Race/ethnicity				
NH [‡] white	61 (28.9)	87 (21.7)	25 (31.3)	116 (22.3)
NH [‡] black	131 (62.1)	278 (69.3)	44 (55.0)	268 (63.1)
NH [‡] other	9 (4.3)	15 (3.7)	5 (6.3)	17 (4.0)
Hispanic	10 (4.7)	21 (5.2)	6 (7.5)	24 (5.7)
Site				
Seattle	95 (44.8)	158 (38.9)	43 (53.8)	189 (44.1)
St. Louis	42 (19.8)	107 (26.4)	19 (23.8)	107 (24.9)
New Orleans	75 (35.4)	141 (34.7)	18 (22.5)	133 (31.0)
Total no. sex partners* [‡]	14 [1–300]	8 [1–185]		
>3 lifetime partners [§]	173 (85.2)	280 (78.4)		
Ever paid for sex [§]	36 (17.0)	44 (10.9)		
Sex with partner same day met [†]	164 (77.4)	243 (60.2)		
Reported a history of STI	121 (57.1)	208 (51.2)	48 (60.0)	221 (51.5)
Current laboratory-diagnosed STI	70 (33.0)	135 (33.3)	25 (31.3)	131 (30.5)
Age discordant ≥5 yr [§]			17 (21.3)	46 (10.8)
Partnership length >3 mo [§]			65 (81.3)	283 (66.1)
Sex within first 7 d of meeting			16 (20.8)	104 (25.6)
Used sex toys with partner [†]			18 (22.8)	17 (4.0)
Believe partner has other partners			25 (32.1)	103 (25.1)
Have concurrent partners [†]			59 (74.7)	215 (51.1)
Females	N = 188	N = 269	N = 93	N = 318
Age (yr)*	22 [18–26] [†]	21 [18–25] [†]	22 [18–25]*	21 [18–25]*
Race/ethnicity				
NH [‡] white	66 (35.5) [§]	61 (22.8) [§]	28 (30.1)	96 (30.5)
NH [‡] black	89 (47.9) [§]	167 (62.3) [§]	49 (52.7)	168 (53.3)
NH [‡] other	14 (7.5) [§]	23 (8.6) [§]	7 (7.5)	29 (9.2)
Hispanic	17 (9.1) [§]	17 (6.3) [§]	9 (9.7)	22 (7.0)
Site				
Seattle	121 (64.4) [†]	133 (49.4) [†]	54 (58.1)	183 (57.6)
St. Louis	31 (16.5) [†]	50 (18.6) [†]	16 (17.2)	57 (17.9)
New Orleans	36 (19.2) [†]	86 (32.0) [†]	23 (24.7)	78 (24.5)
Total no. sex partners* [§]	13 [1–300]	5 [1–750]		
>3 lifetime partners [†]	163 (90.6)	165 (66.3)		
Ever received money for sex [†]	50 (26.6)	16 (6.0)		
Sex with partner same day met [†]	114 (60.6)	55 (20.5)		
Reported a history of STI	139 (73.9) [§]	174 (64.7) [§]	67 (72.0)	212 (66.7)
Current laboratory-diagnosed STI	50 (26.6)	83 (30.9)	31 (33.3)	92 (28.9)
Age discordant ≥5 y			32 (34.8)	106 (33.3)
Partnership length >3 mo [§]			80 (86.0)	231 (73.3)
Sex within first 7 d of meeting [†]			29 (31.2)	53 (17.3)
Used sex toys with partner [†]			17 (18.5)	13 (4.1)
Believe partner has other partners [†]			48 (53.9)	102 (33.4)
Have concurrent partners [†]			58 (64.4)	142 (45.7)

*median [range].

[†]*P* < 0.005.[‡]NH indicates Nonhispanic.[§]*P* < 0.05.^{||}Self-reported; including chlamydia infection, gonorrhea, trichomoniasis, syphilis, genital herpes, genital warts, HPV, BV, pelvic inflammatory disease (PID), cervicitis or mucopurulent cervicitis, urethritis, vaginitis, or HIV/AIDS.[¶]STI indicates positive diagnosis for at least one of the following: *C. trachomatis*, *N. gonorrhoeae*, *T. vaginalis*, *M. genitalium*, or isolation of HSV-2 from lesions.

justed logistic regression models for men and women stratified by city, having had sex on the same day as meeting a partner was associated with ever engaging in AI both for men [Odds Ratio (OR) 2.3 (95% CI, 1.55–3.31)] and women [OR 6.0 (3.95–9.10)]. Ever having paid for sex was associated with ever

engaging in AI for men [(OR 1.7 (1.04–2.70))], while ever having received money for sex [OR 5.7 (3.13–10.4)] or having greater than 3 lifetime partners [OR 4.9 (2.78–8.58)] were associated with ever engaging in AI for women. Individuals who had ever engaged in AI were more likely to report a history



*Male: gave money for sex, Female: received money for sex

Figure 2. Multivariate logistic regression analyses, stratified by city, of ever having anal intercourse by gender: associated characteristics and behaviors.

of any STI (65% vs. 57%, $P = 0.007$), but not more likely to have laboratory-diagnosed STI at study enrollment. History of injection drug use was not associated with ever AI for men, with 4.8% of those reporting AI also reporting drug use versus 2.8% reporting drug use among those not reporting AI, but was significant among women (4.4% vs. 0.4%, respectively), although these numbers are very small.

Separate multivariate analyses stratified by city were conducted for ever having practiced AI for men and women. Women who had sex on the same day they met a partner (AOR 3.9; 95% CI, 2.46–6.21), ever received money for sex (AOR 2.8; 95% CI, 1.40–5.45), and who reported greater than 3 lifetime sex partners (AOR 2.8; 95% CI, 1.56–5.07) were significantly more likely to report ever engaging in AI (Fig. 2). Men who reported having sex on the same day they met a partner (AOR 2.0; 95% CI, 1.33–3.06) were significantly more likely to report ever having AI.

Factors Associated With Engaging in AI With the Most Recent Partner

Of the 920 individuals who provided detailed information on their most recent partner, 173 (19%) reported having had AI at least once with that partner. Among these, 38% ($n = 65$) reported they had ever used a condom for AI (31% of women and 45% of men, $P = 0.06$). In univariate logistic regression analysis stratified by city, men who reported having

a partnership lasting longer than 3 months [OR 2.22 (1.22–4.04)], using sex toys [OR 7.10 (3.46–14.6)], and having concurrent partners [OR 2.83 (1.64–4.87)] were more likely to report AI with their most recent partner. Among women, AI with the most recent partner was associated with a partnership of longer than 3 months duration [OR 2.24 (1.18–4.25)], having vaginal sex within the first 7 days of the partnership [OR 2.17 (1.28–3.69)], believing that the partner had other concurrent partners [OR 2.33 (1.44–3.78)], having a concurrent partner [OR 2.16 (1.32–3.52)], and using sex toys [OR 5.25 (2.43–11.3)]. Whether the last partnership was exclusive or casual was not associated with engaging in AI within that partnership, nor was laboratory diagnosed STI.

In multivariate logistic regression analysis stratified by site, men who reported sex toy use [AOR 5.6 (2.63–12.0)] and having concurrent partners [AOR 2.2 (1.21–4.11)] in the partnership were more likely to report AI with the most recent partner. For women, having sex within the first 7 days of meeting that partner [AOR 2.4 (1.28–4.37)], believing that their partner had concurrent partners [AOR 1.9 (1.12–3.22)], and using sex toys [AOR 5.7 (2.31–14.0)] were associated with AI in that partnership (Fig. 3).

To consider whether these young adults were having AI instead of vaginal intercourse to preserve their “virginity” we examined AI among those who reported they had never had vaginal intercourse. Of the 20 women who reported never

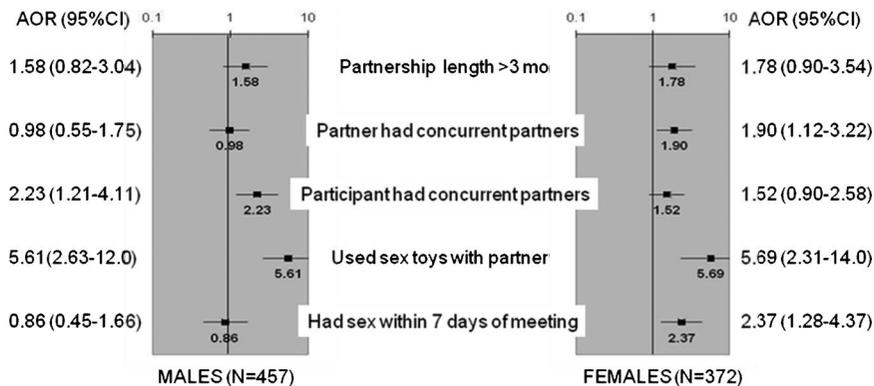


Figure 3. Multivariate logistic regression analyses, stratified by city, of having anal intercourse with most recent partner by gender: associated characteristics and behaviors.

having had vaginal sex, 5 (25%) reported ever engaging in AI, and 4 (20%) reported AI with at least one of the past 3 partners. Of the 46 heterosexual men who reported never having vaginal intercourse, 6 (13%) reported ever having AI, and 7 (15%) reported AI with at least one of the last 3 partners. Male "virgins" were significantly less likely to have had AI than men who had ever had vaginal intercourse (13% vs. 36%, $P = 0.001$). Similarly, women who were virgins were somewhat less likely to have had AI than women who reported having had vaginal intercourse (25% vs. 42%, $P = 0.13$).

DISCUSSION

AI was common among these heterosexual young adults attending STD clinics in all 3 of the cities studied. Condom use during AI was reported by few and by fewer than those reporting condom use during vaginal intercourse. Moreover, the young adults who practiced AI had riskier sexual behavior in general than other young adults. AI was associated with selling/trading sex, having sex with new acquaintances, having concurrent partners, and engaging in other less traditional sexual behaviors such as using sex toys. These associations suggest that those who practice AI have an expanded sexual repertoire.

Except for an association for women in univariate analysis with very small numbers we did not see an association with drug use in our study, yet other studies suggest that drug users are more likely to practice AI than non drug users, particularly methamphetamine users.^{21,22} We did however; see an association of ever engaging in AI with exchange of sex for money. Although it is not clear if AI is practiced itself for money, it is clearly associated with engagement in commercial sex during which women may engage in sexual practices in response to requests by others. Additionally, both men and women who practiced AI were more likely to have sex with partners they did not know well (i.e., within the same day or week of meeting). Other studies have noted similar associations of AI with trading sex for money and sex with an IDU among young women in non-STD clinic populations.²³ Finally, although other studies have noted differences by ethnicity,²⁴ neither the National Survey of Family Growth²⁵ nor our study noted differences in this practice by ethnicity.

Almost one-third of participants in our study reported ever engaging in AI and this was a young group, suggesting that lifetime rates will be high among these STD clinic attendees as they age. Moreover, the high prevalence of this behavior among these young adults suggests an early initiation of this behavior. Our lifetime prevalence of ever practicing AI closely matches that reported in the National Survey of Family Growth (30% of women and 34% of men) which included a much wider age range of 18 to 44 years of age.¹ In contrast, AI was reported by only 11% of men 15 to 19 years old in the 1995 National Survey of Adolescent Men,²⁶ and by 21.7% of sexually active women 18 to 29 years in a population based study in low-income neighborhoods in Northern California.²³ Despite the different age ranges and sampling frames for these studies, the higher proportion of our young STD patients reporting AI relative to the general population samples of young adults is consistent with previous observations that STD clinic attendees engage in more high risk behaviors.

We found little evidence that AI was being used to maintain virginity as very few virgins reported AI. However, there were few virgins attending these STD clinics and there may be more young adults in the general population who use

AI to maintain virginity. Nevertheless, loss of virginity has been linked primarily with vaginal and AI²⁷; thus, it is unlikely that AI is used as much as oral sex to maintain virginity. This suggests that reasons for engaging in AI are more likely social, partnership, and/or physical, rather than to maintain virginity.

Our analyses of AI with the last partner provide unique insight into how AI occurs in partnerships. Unlike other studies²³ AI was not associated with the type of partner (i.e., exclusive or casual). However, AI was more common in partnerships where there was concurrency. Thus, AI may be practiced in partnerships that are unstable, and sexual experimentation may be used to sustain such partnerships. The fact that AI was reported more by women who believed their partners had concurrent partnerships and more by men who themselves had concurrent partnerships, lends support to this possibility. Moreover, the partnerships with AI were also partnerships in which sex was initiated quickly (within 7 days), also suggesting that there may be instability or adventurousness in these partnerships as the partners did not know each other well or have an established social relationship before their sexual relationship.

Other studies have noted that AI was reported more often by those engaging in experimental sexual activities such as bisexuality.²⁸ Although our study population was restricted to heterosexuals, in exploratory analyses among the 127 excluded bisexual men, we found that they practiced AI more with their women partners (20%) and in more of their partnerships (42%) than did men who only had sex with women (13%). However, our numbers of bisexual men were too small for more detailed analyses of this issue, warranting further study.

The relatively high proportion of young adults reporting AI raises concerns about increased risk for acquisition and transmission of STIs including HIV among young adults. The practice itself seems to be increasing; the proportion of a random sample of Seattle residents who reported AI increased from 4.3% in 1995 to 8.3% in 2004.²⁹ Although we found no association of AI with a combined indicator of having any of several STIs, we did not test participants for anorectal STI, thus we likely missed cases. The risk for HIV acquisition or transmission via AI is compounded by infrequent condom use during AI, exposure to many partners, exposure to risky partners (including commercial and concurrent partners), and quick initiation of sex after meeting a partner among those practicing AI. These observations suggest that individuals who practice AI may be bridging sexual networks and further increasing the likelihood they will be exposed to or will transmit HIV and highlights the need for broad behavioral counseling for young adults, particularly those seen in STD clinics, about the risks of HIV transmission/acquisition during AI. In our study, condom use with AI was reported by less than half of participants, and fewer women. HIV prevention programs should address the practice of AI with young heterosexuals and encourage condom use to reduce their risk of HIV infection, especially for women where AI has been associated with HIV infection.³⁰

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